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## Executive Summary

Phase 1 of the APCO Project 25 standard was completed in August 1995 at the APCO conference in Detroit. This standard was fostered by the community of users in public safety, with significant contributions from a wide variety of manufacturers. This standard is leading the market for public safety with technology that is both advanced and currently practical to manufacture. Superior new technology has been selected for several parts of the standard and license agreements are available for the essential patents.

The APCO Project 25 standard is an expression of a user need for spectrum efficiency, interoperability, compatibility, multi-vendor sourcing, and migration. It has succeeded in all aspects of these goals. Motorola is supporting this standard because our customers are demanding this standard. Motorola's goal of total customer satisfaction can allow nothing less. While Motorola supports the APCO Project 25 standard, we also support the needs of our other customers, whether they be within the United States or international, whether they be private radio customers, customers of public cellular radio systems, or other public radio communications systems. Our customers have a wide variety of needs, and Motorola intends to satisfy each one. When those needs are embodied in other standards, Motorola will support them.

The APCO Project 25 standard provides for backward compatibility with existing systems and their migration to the standard, and Motorola fully intends to support this goal of the standard. This standard applies to both conventional as well as trunking systems, and Motorola intends to support both types of systems.

Recently, Dr. Charles Jackson published a report which is critical of the APCO Project 25 standard. The report alleges that this standard fails to meet the goals of spectrum efficiency, that it is complex, that it restricts competition, that it fails to promote interoperability, that it is slower than planned, that it is incomplete, that only a handful of manufacturers are supporting it, and that patented technology limits competition. These claims have been made before and answered by the users in articles printed in the APCO bulletin. Motorola feels that each and every one of these claims is false, and further that Dr. Jackson is attacking the standard on behalf of a client, namely Ericsson Inc., without regard to any merit of the arguments themselves.

Dr. Jackson acknowledges that the users have expressed their needs well in the APCO Project 25 standard. He then criticizes this APCO Project 25 standard for not satisfying those needs even though the users involved in the project have supported the standard. This is a self contradictory position for Dr. Jackson. Regardless of Dr. Jackson's attempt to deny the users their standard, Motorola intends to satisfy the users needs by complying with their standard.

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## **1. Motorola Perspective on the Public Safety Standard**

This section presents the "big picture" of standards so that one can put the many claims and rumors about the APCO Project 25 Standard in perspective.

The issues covered include:

- Why Motorola supports user driven standards.
- What, from Motorola's perspective, constitutes a workable standard.
- How market specific needs and restrictions affect technical choices.
- And how Motorola intends to support and comply with the choices made by users through standard setting bodies - whatever those choices turn out to be.

One of Motorola's highest priority strategic goals is to serve the user-owned, private systems markets, including the public safety market, as the worldwide supplier of choice for integrated wireless communications and information solutions.

Motorola aims to provide the best customer value in critical market specific features, system reliability and operating costs. We also intend to be the first to deliver these customer desired solutions.

To be the supplier of choice, it is critical that we listen to the customer. One of the ways we do this is to continually survey our customers. In 1989, during the discovery phase of this formal process, open system architecture was identified as a requirement important to our customers. While we have worked with standard setting bodies before, this survey told us that Motorola and the industry need to do more.

The reasons a user community would want to set standards are easy to see. Communications standards make their lives considerably easier and more economical. Standards can provide an effective level of system performance to meet their communication needs without the burden of maintaining large staffs of communication experts. Standards can assure interoperability between other agencies and other manufacturers' systems. A well conceived standard allows users a choice of many interoperable products from various sources with a wide range of competing features.

While it is easy to see why users would support the standard setting process, a manufacturer's reasons for supporting standards are quite different. Standards, once they are established, define a market that manufacturer's can use to sell products. This lowers the risk of product development and lets manufacturers exploit the economies of scale in an established market to lower production costs. On the other hand, standards do tend to slow the introduction of new technologies. Another negative from the manufacturer's perspective is the effect standards have on the value of proprietary intellectual property.

Considering these problems with standards, it is easy to see why a manufacturer might not support standards. Public safety is one industry where standards can be beneficial. The unique, critical needs of public safety demand that they have a voice in the functionality of their systems.

Further, there are also some advantages to properly constructed standards for manufacturers that outweigh the disadvantages.

In order for anyone, either in the user community or in manufacturing, to benefit from a standard, certain criteria must be met by the standard setting process. A standard must minimize complexity and not be unwieldy. The standard must lead the market, selecting technology that is just beginning to reach commercial viability.

## 1.1 Standard Should Lead the Market

So to be successful, any standard setting body must balance the possible with the practical. The standard must lead the market, but it must lead it to proven technology that can be economically delivered to the user when they need it.

That leads to the next criteria for successful standard setting - timeliness. The standard setting process is put in motion by user needs (interoperability, protection of investment, etc.), and those needs are not put on hold during the process. They grow as time goes on. Many users need APCO Project 25 today, some "need it yesterday."

## 1.2 Standard Should Allow Innovation

Another criterion for a successful standard is that it allows innovation and competition by recognizing the rights of those who own intellectual property. By protecting their investment in research and development, manufacturers can continue to invest in the development of the advanced systems and features the public safety industry needs.

By their very nature, standards cannot be proprietary. So for a standard to be successful, manufacturers whose proprietary technology has been selected as the standard must be willing to license that technology for second sources. APCO Project 25 recognized this requirement early in the process and the participating vendors formulated a Memorandum of Understanding (MOU) on Intellectual Property that has been signed by many manufacturers involved in the project. There has been some comments in the press stating that Motorola holds many essential FDMA<sup>1</sup> patents surrounding APCO Project 25, and that Motorola might not want to license them. Let this set the record straight. As a signatory to the APCO Project 25 Memorandum of Understanding, Motorola has agreed to make any intellectual property that is essential to the standard available as a license under fair and reasonable terms. In some cases this is royalty free. We feel that our terms and conditions should in no way inhibit any MOU signatory manufacturer from competing in this market.

## 1.3 Standard Should be User Driven

By far, the most important criterion for a successful standard is that it is user driven. Motorola welcomes user inputs into a standard because it serves to focus the standard on the satisfaction of user needs. In this way, the standard is much more likely to be successfully adopted by users. APCO Project 25 is a good example of a user driven standard.

When Project 25 was established in 1989, the Steering Committee wisely set clear requirements in order to assure that the chosen technology would meet specific user needs.

- |                    |                                    |
|--------------------|------------------------------------|
| • Voice Quality    | • Range                            |
| • Data Capability  | • Spectrum                         |
| • Encryption       | • VHF, UHF, 800 MHz                |
| • Interoperability | • Telephone Interconnect           |
| • Operation        | • Compatibility/Graceful Migration |
| • Size and Weight  | • Cost                             |

In examining how a technology meets these requirements, it is absolutely critical that these requirements be viewed within the context of the current public safety industry in the United States.

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<sup>1</sup>FDMA. Frequency Division Multiple Access is the method of radio frequency channel separation predominantly used by public safety today.

Public safety operates under geographic, financial, and political conditions that are different from those in Europe or Asia or even other industries within the U.S. APCO Project 25 has taken into account these unique needs of the U.S. public safety community by considering all of the practical alternative technologies.

What may be the technology of choice in Europe or Japan certainly may not be the technology of choice here. To suggest that there is a single technical solution which addresses every market's needs is either naive or self-serving on the part of a radio manufacturer.

It is instructive to consider how these factors came into play when the users considered the choice of channel access techniques, i.e., FDMA and TDMA<sup>2</sup>. The users considered both technologies for their standard, first from the point of view of spectrum efficiency, and then from the point of view of the remaining user needs. With regard to spectrum efficiency, both FDMA and TDMA could deliver a 4 to 1 improvement in spectrum efficiency when compared to 25 kHz analog channels, and considering how many equivalent voice channels could be provided. Since there was no real difference with respect to spectrum efficiency, the users considered their remaining needs, including interoperability, compatibility, range, the various radio bands, adaptability to small as well as large systems and the size and weight of portable radios, and concluded that FDMA was the appropriate choice.

#### **1.4 Standard Should be Backward Compatible**

Another criterion for a successful standard is that it should be backward compatible with existing systems while providing a forward migration path to future systems. A well conceived standard recognizes this fact and does not jeopardize the previous investments the user community has made in communication systems.

#### **1.5 Motorola Meets the Needs of All Customers**

Motorola is responding to the needs of our diverse customer base by offering multiple digital solutions in both Land Mobile and Cellular radio services. In Land Mobile, we offer both FDMA and TDMA digital solutions. Those customers needing FDMA can purchase our Astro™ system, and those needing TDMA can buy our iDEN™ system. In Cellular, we are pursuing TDMA and Code Division Multiple Access (CDMA) digital solutions.

In addition to these choices for multiple access, public safety systems also include both trunked and conventional systems. Trunking is usually denoted by a system controller which assigns carrier frequencies (and time slots for TDMA or codes for CDMA) for radios as service is demanded. Conventional systems normally lack this control facility. It is important to keep in mind that a majority of public safety systems are conventional. A substantial and growing portion of public safety uses trunked radio systems. Motorola provides both types of systems for our customers.

Motorola is not attempting to dictate to users which technology is right for them. We feel our role in the standard setting process is to act as advocates for the users.

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<sup>2</sup>TDMA Time Division Multiple Access is the method of radio frequency channel division used in digital cellular and public shared systems like iDEN™ (Integrated Digital Enhanced Network)

The six year process of Project 25 has involved detailed technical proposals, open to technical scrutiny and challenge by the manufacturing community and others. It represents the combined effort of APCO, NASTD<sup>3</sup>, and the U.S. Federal Government to give a voice to user groups on municipal, state, and national levels. That voice has been heard, and the decisions of the Steering Committee are sound. The time has come to move ahead with this much needed and long awaited standard.

Motorola urges manufacturers and users to support the efforts of the APCO Project 25 Steering Committee and encourages them to move to the timely acceptance of APCO Project 25.

APCO Project 25 phase 1 has been completed. The standard has been written and published, and it is now time for manufacturers to develop products. The next step in the maturation of the standard is to demonstrate interoperability between different vendors' implementations. This demonstration will lock down the standard, such that further changes in the standard are frozen until compatibility with implementations can be agreed. The standard completion coupled with the comprehensive work to facilitate lock down testing for the standard allows manufacturers and users to now define their specifications for new public safety communications systems.

## **2. Comparison to a Report by Charles Jackson**

This section is an analysis and comment on a report by Charles Jackson recently circulated on a limited basis at the APCO Conference in Detroit, Michigan and to some members of AASHTO<sup>4</sup>.

Charles L. Jackson, A Need to Be Heard: Will Project 25 Meet Public Safety Communications Needs in 1995 and Beyond?, July 1995.

For brevity, this report will be referred to as the "Jackson report."

### **2.1 Introduction to the Jackson Report Analysis**

Dr. Jackson recognizes that public safety radio has become an essential element in use by almost every public safety agency today. He also recognizes that most people are unfamiliar with radio technology and "... few appreciate how difficult it is to build a mobile radio system that works well." He goes on to point out that the operating environment creates much more difficult operating circumstances, including shock, vibration, power sources than operation of commercial office electronics.

Jackson further states that:

"... Project 25's goals were perceptive: These goals matched the environment and the needs of the public safety community."

"Project 25 has made significant contributions towards a better understanding of public safety agencies communications needs. For this alone, Project 25 deserves to be called a success."

Motorola agrees with the above positive assertions. However, we disagree with Jackson's negative claims regarding APCO Project 25.

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<sup>3</sup>NASTD, The National Association of State Telecommunication Directors.

<sup>4</sup>AASHTO, The American Association of State Highway Transportation Officials.

This report by Charles L. Jackson, sponsored by Ericsson, Inc., erroneously claims that " ... APCO's Project 25 design fails to meet its goals." Dr. Jackson erroneously claims that:

- Project 25 fails to meet its spectrum efficiency goals.
- Project 25 fails to promote competition over the system life cycle.
- Project 25 fails to promote interoperability.
- Project 25 system design has significant flaws.

These allegations are not new and have been previously addressed by APCO Project 25 in material published in the APCO Bulletin.

Motorola believes that APCO Project 25 standards will meet the needs of public safety as described in the project's goals of spectrum efficiency, interoperability and life cycle competition. Any claim by Jackson of system design flaws is false. In fact, the system design of the APCO Project 25 standard compares favorably with any land mobile radio standard in existence today.

## 2.2 Spectrum Efficiency and Public Safety Access to Spectrum

Dr. Jackson points out obvious truths about public safety that:

- There is a shortage of spectrum.
- Public safety is not well suited to bid in auctions for spectrum.
- There is pressure on public safety to justify that it is using spectrum efficiently.

Following these obvious truths he then claims that public safety is not pursuing "maximum radio spectrum efficiency" with the claim that only "... old-fashioned channel-splitting ..." is being used. Dr. Jackson's report conveniently ignores the fact that important spectrum efficiency factors like throughput and geographic reuse are significant multipliers in public safety systems serving medium and low density applications.

In Dr. Jackson's narrow focus he quotes the FCC<sup>5</sup> as stating "Regarding 12.5 kHz channelization, we find would be more efficient for digital data transmissions but would not offer significant improvement in spectrum efficiency for voice communications." Furthermore, 12.5 kHz "does not meet the Commission goals of substantially increasing channel capacity."

If Dr. Jackson were to continue quoting this referenced paragraph, his readers would find that the FCC provides 12.5 kHz for good reasons:

"A 12.5 kHz bandwidth, however, has the following benefits:

- (1) it provides compatibility with the 12.5 kHz APCO-25 standard equipment being developed by manufacturers in conjunction with the public safety community;
- (2) it promotes interoperability with 12.5 kHz equipment used by the federal government users (such as the Federal Bureau of Investigation, the Department of Defense, and the US. Forestry Service); and
- (3) 12.5 kHz equipment is currently available and can be employed *immediately to alleviate severe congestion situations.*" (*Emphasis added*)

This is one example of Dr. Jackson's selective perception of APCO Project 25 and spectrum efficiency. Dr. Jackson points out that public safety "will always be vulnerable to charges (well founded or not) that they are not using the spectrum efficiently." One should note that Dr. Jackson is one of those making those charges and the charge is certainly not well founded!

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<sup>5</sup>Report and Order and Further Notice of Proposed Rule Making, FCC Docket PR 92-235 at paragraph 25.



Jackson discusses a lot of ways to measure spectrum efficiency. The discussion includes topics of cellular frequency reuse, micro cells, etc. These topics are not directly applicable to the needs of public safety.

Motorola advocates a very simple method of determining spectrum efficiency. The measurement is determined by dividing channel bit rate by the channel bandwidth. This yields a figure of merit expressed in units of bits per second per Hertz (bps/Hz). We would point out here that by this figure of merit the APCO Project 25 Standard spectrum efficiency exceeds both the planned Ericsson and TETRA<sup>6</sup> systems.

System — Bandwidth	Channel Rate	Spectrum Efficiency
Ericsson F-TDMA <sup>7</sup>		
Phase 1 — 25 kHz	16 kbps	0.64 bps/Hz
Phase 2 — 12.5 kHz	16 kbps	1.28 bps/Hz
TETRA 25 kHz	36 kbps	1.44 bps/Hz
APCO Project 25		
Phase 1 — 12.5 kHz	9.6 kbps	0.768 bps/Hz
Phase 2 — 6.25 kHz	9.6 kbps	1.536 bps/Hz

Table 1 Spectrum Efficiency Comparison

It should further be noted that this efficiency is achieved in all system configurations of the APCO Project 25 Standard, either conventional or trunked. Neither the Ericsson nor the TETRA proposed systems have a conventional configuration at this time as their most basic configurations are trunked.

### 2.2.1 Cellular Approach

The idea of cellular systems is to use cells for mobile coverage in an extended geographic area with frequencies reused in distant cells. Portable coverage in buildings is then provided with progressively smaller cells called micro cells. Micro cells are also used to provide more simultaneous communication paths by splitting larger cells. Obviously, as the number of cells proliferates, more sites and infrastructure are required. A significant factor in the complexity of cellular systems is the intricate call hand-off procedure between cell sites as radios travel throughout coverage areas.

### 2.2.2 The Cost of Complexity

In Jackson's section on spectrum efficiency, Jackson incorrectly states that "The Project 25 design makes all systems—rural and urban, small and large—bear the costs of complexity." In an attempt to prove his point Dr. Jackson quotes an article by R. Steele<sup>8</sup> about the use of micro cells in cellular radio design:

"... the greatest single factor in enhancing spectral efficiency of a network is not complex multiple access techniques, efficient speech and channel coding, modulation, powerful protocols, etc., but the mass deployment of microcells. By this simple technique we can repeatedly and efficiently reuse the precious spectrum."

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<sup>6</sup>Trans European Trunked RAdio standard being developed in Europe.

<sup>7</sup>A proposed Ericsson system using hybrid TDMA technology.

<sup>8</sup>Raymond Steele, James Whitehead, and W.C. Wong, "System Aspects of Cellular Radio," *IEEE Communications Magazine*, January 1995, Vol. 33, No. 1, pp. 80-86.

While this may be true for cellular systems with their need for extensive infrastructure, small rural public safety users do not need a costly communications system utilizing micro cells and complex network infrastructure.

The authors, R. Steele et al, of the *same quoted article* point this out!

"The most effective way of increasing network capacity is to decrease the cell size, although the *complexity of the network infrastructure increases*." (*emphasis added*)

Thus, Dr. Jackson's solution of increasing the number of micro cells, results in the very problem, increased complexity and cost, that he alleges is part of an APCO Project 25 standard.

In fact, the APCO Project 25 solution is scalable from conventional simplex single channel systems for use by small departments to complex wide area trunked networks for large users. The small systems are very simple and they do not require the complexity involved in large systems. The APCO Project 25 standard provides solutions of varying complexity and cost which can be tailored to each users needs.

### 2.3 Competition Over the Life Cycle

APCO Project 25 phase 1 includes six open interfaces<sup>9</sup>. Each of these open interfaces affords a user the ability to add on compliant products from any other manufacturer. Everything from mobiles and portables at the Common-Air-Interface to complete additional systems at the Inter SubSystem Interface (ISSI).

In order to challenge the APCO Project 25 system design, Dr. Jackson points to a seventh open interface, not yet defined, which APCO Project 25 users decided to consider in phase 2 of their effort. This seventh open interface is called the console interface and Dr. Jackson calls it an "A-interface"<sup>10</sup>. This interface, contrary to Dr. Jackson's assertion, has not been deployed in today's fielded cellular systems.

Dr. Jackson is speculating on a very limited potential for cost savings while carefully ignoring all the other open interfaces that have a significant potential for life cycle procurement impact that the APCO Project 25 standard provides. APCO Project 25 provides open interfaces for mobile and portable subscribers, network management, telephone interconnect, radio and data systems.

The largest and most likely system life cycle cost is the addition of mobile and portable subscribers, not base stations. Dr. Jackson claims that "Base stations account for a significant portion of the cost of a mobile radio system." As an example Dr. Jackson uses a ratio of one base station for every 70 mobiles (it could be argued that this ratio is very low). If a typical base station costs \$15,000 dollars and a typical mobile or portable \$2000, the savings that could result from competition for subscribers is almost 10 times the saving that could be realized with competition for base stations. Again it appears that Dr. Jackson is somehow missing the big picture.

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<sup>9</sup>Project 25 Phase 1 defines six standard open interfaces: the Common-Air-Interface, the Telephone Interconnect Interface, the Mobile & Portable Data Interface, the Host Data Interface, the Network Management Interface and the Inter Sub System Interface (ISSI).

<sup>10</sup>The reader should note that the "A-interface" mentioned by Jackson is terminology borrowed from cellular standards. APCO Project 25 uses different terminology, and designates the A-interface as the data interface on mobile and portable radios. Jackson seems to overlook this naming convention. We will use "A-interface" in quotes to denote the console interface that Jackson wants, and not the data interface on mobiles and portables as designated by the standard.

## **2.4 Promote Interoperability**

Jackson's report on APCO Project 25 suggests that interoperability is not improved since radios will not interoperate across the widely separated radio frequency bands in the public safety land mobile radio frequency allocations. This assertion is very presumptuous. There are already multi-band radios operating across the bands of public safety<sup>11</sup>. In addition, several fixed wing aircraft and helicopters have radios which operate across all the public safety radio bands. What these radios need is a Project 25 standard protocol and a political agreement to permit interoperability across the radio frequency bands.

The Project 25 standard ISSI allows the interconnection of dissimilar systems whether they be in different radio bands, constructed at different times or supplied by different vendors. This allows backward compatibility and interoperability with compliant systems offered by different vendors.

The Project 25 standard simplifies all aspects of interoperability, whether it be achieved by direct radio to radio methods or by those techniques which use a network interface and thereby promotes simpler and more economic interoperability. Motorola supports these interoperability options and backward compatibility into current Motorola systems.

## **2.5 Alleged Significant Flaws**

Dr. Jackson alleges the existence of several flaws in Project 25, including the claims that the project is coming out slower than planned, that the standard is not a full suite (lacking the "A interface"), that it is supported by only a handful of manufacturers, and that IPR licenses are limited in scope. Motorola challenges each of these assertions.

### **2.5.1 Project 25 Progress**

From a manufacturers perspective APCO Project 25 has progressed more rapidly than standards not directly influenced by users. The users have been continually calling for expeditious but deliberate consideration and have been making decisions critical to timely completion. For example, the users set the schedule deadline for phase 1 completion in August 1995. In retrospect, the grand scope of the standards demanded careful consideration of contributions from numerous parties for technology to be selected for public safety. This consideration process has necessarily taken months of time, however, the result should be well worth the effort. The current state of affairs for the standard is that it is complete, and manufacturers can now work to build products to meet the users needs expressed by the standard. Motorola does not believe that the careful consideration and standard development has been slow or tardy in any aspect.

### **2.5.2 Console Interface**

Dr. Jackson alleges that the lack of his "A Interface" is a flaw in the standard. In our view this does not detract from any part of the standard, and should not inhibit the manufacture or use of radios compliant to the standard. It is interesting to note that the project decided to defer the console interface in question to follow phase 1 because of their desire to complete phase 1 on schedule. Dr. Jackson seems to be creating controversy by complaining first about the schedule and then by introducing more work to retard that very same schedule.

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<sup>11</sup>Global-Wulfsberg, model FLEX1, Harris, model PRC117 and Motorola, model URC200 are examples of multi band radios currently available across public safety bands from 30 MHz to 420 MHz.

### 2.5.3 Handful Of Manufacturers

Dr. Jackson suggests that the standard is flawed because several companies (AT&T, Hughes, Qualcomm, and Nortel are named by him) are not participating. He only mentions in a footnote several who are, including Motorola, RELM, Stanilite, E.F. Johnson and Transcript International. One can only determine from Dr. Jackson's statements that several manufacturers in the world have business interests elsewhere at the moment. When Dr. Jackson concludes that these manufacturers "are well positioned to build systems for the public safety community" he seems to be confusing their business interests with their technical capabilities. These manufacturers who have not provided radio products for public safety systems in the past can enter the market at any time they so desire and the standard provides for this. The standards process is open to any participant including these manufacturers (even Dr. Jackson). Many of these manufacturers have been invited to participate and have attended at least one meeting. Motorola believes that the number of manufacturers who have announced intentions to supply compliant product are sufficient to meet the needs of the users. Additionally, the competitive situation under APCO Project 25 has been improved and the opportunity for further improvement exists as users support the standard and other manufacturers join in the offering of compliant products and systems.

### 2.5.4 Intellectual Property Rights

Dr. Jackson erroneously claims that the Intellectual Property Rights are limiting APCO Project 25 equipment competition. As Dr. Jackson points out, already five manufacturers have publicly stated their intentions to offer APCO Project 25 compliant equipment and systems. His suggestion that Motorola holds key patents and is unwilling to share those patents is totally incorrect. Apparently Dr. Jackson and his collaborators on this report have elected to ignore the fact that Motorola, Ericsson and over twenty (20) other vendors have signed a Memorandum Of Understanding (MOU) in which that vendor agrees to license essential Intellectual Property Rights they hold. All of the vendors (including Ericsson) who have signed this MOU have agreed to license essential IPR they hold at fair, reasonable and non-discriminatory terms. Motorola has also licensed non-essential technology, in order to better support the standard. Motorola has also signed license agreements with others who hold essential IPR. Dr. Jackson's claim that these policies are somehow limiting competition is entirely baseless.

## 2.6 Report Presents Only One Side Of Each Question

Dr. Jackson is not writing an objective paper for scholarly purposes as an independent consultant. This may explain the reason that he seems to present only one side of the case leaving out important facts that contradict his position. There are examples of this, as cited above, in articles and reports that he uses as sources for his paper. In addition the report lacks specific solutions to each criticism and is a reprise of old claims about Project 25 made by Ericsson.

### 2.6.1 Report Lacks Constructive Criticism

The process for Project 25 has attracted attention from a wide variety of manufacturers, for several years. There are currently 25 manufacturers that are signatories to the IPR MOU, and there are 5 manufacturers that are committed to producing products conforming to the standard. The standard that has evolved incorporates inputs from the entire audience of manufacturers and users, and has been reviewed in a lengthy process that has resulted in numerous contributions and changes. With all of these contributions, there is not one single contribution from Dr. Jackson, nor is he recorded as attending any of the meetings. While Dr. Jackson may feel justified in his criticism, it would be more appropriate for him to make them in the standardization process than in an *ex parte* report outside of the process. Dr. Jackson's report and its conclusions offer no solutions to the questions he asks. Specifically, Dr. Jackson purports to answer the question "How can a public safety agency best meet its communications needs?" The answer to this question, which Dr. Jackson raises is nowhere in this report. Motorola feels that Project 25 solutions can best meet public safety communications needs.

### **2.6.2 Report Echoes Ericsson Claims Against Project 25**

Dr. Jackson and his report are sponsored by Ericsson, Inc. Ericsson has been a vocal detractor in Project 25. Ericsson actions in Project 25 were characterized by E. F. Johnson<sup>12</sup> as a "scorched earth" policy. The Jackson report continues to undermine the positive work of the public safety users who have diligently and continuously worked in an open and deliberative way to develop the Project 25 Standard. Motorola deplores this report which is part of continued Ericsson activity to destroy or delay the use of the Project 25 Standard by public safety users.

### **3. Summary**

Phase 1 of APCO Project 25 has been completed. This is a standard driven by the public safety user community, and expresses their needs admirably. Motorola intends to satisfy those needs by complying with the standard. Motorola's role in the standard development has been to act as advocates of the users in the development of their standard.

APCO Project 25 has met and exceeded its technical goals. Both short term and long term spectrum efficiency have been a part of the development of the APCO Project 25 Standard. The spectrum efficiency of the standard compares favorably with other land mobile radio standards in the world.

One goal for the standard was to facilitate backward compatibility with the existing base of installed equipment and to migrate to the new standard. The technology selection best fits the need by public safety in an economical migration path from analog to digital technology. The technology selection also fits the migration in spectrum efficiency reflected in the FCC rules and regulations.

The standard is well on the way to attaining the goal of interoperability and multi-sourcing from different vendors. Licenses for essential technology for the standard are available due to a Memorandum of Understanding between the vendors. The next step to demonstrate interoperability will be a lock down test between the participating vendors.

Dr. Charles Jackson has written a report criticizing the standard for failing to meet its goals. He claims that the standard does not meet the goal of spectrum efficiency, that it is complex, that it does not achieve interoperability, that it is tardy in its schedule, as well as incomplete, that only a small number of vendors support it, and that patented technology limits competition. Each and every one of these objections has been answered before by the users in the APCO Bulletin, as well as here in this report. Motorola believes that all of Dr. Jackson's negative allegations are completely incorrect, and that his reasoning is motivated by Ericsson's opposition to the standard. Regardless of Dr. Jackson's claims to the contrary, Motorola is confident that the users needs can be met by complying and building systems and equipment to their chosen standard.

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<sup>12</sup>Part of E. F. Johnson's presentation to the APCO Project 25 Steering Committee, 1/27/95.